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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/517,987 | 03/03/2000 | Kuei-Wu Huang | 94-C-096C2 | 5571 |

30425 7590 06/06/2003
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| EXAMINER | |
| BOOTH, RICHARD A | |
| ART UNIT | PAPER NUMBER |

2812

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/517,987 | HUANG ET AL. | |
| | Examiner | Art Unit | |
| | Richard A. Booth | 2812 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 22 May 2003.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 77-96 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 77-96 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
- 1) Certified copies of the priority documents have been received.
 - 2) Certified copies of the priority documents have been received in Application No. _____ .
 - 3) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 77, 81-90, and 92-96 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu, U.S. Patent 4,841,347.

Hsu shows the invention as claimed including a substrate 12; a field oxide 10 over the substrate, the field oxide 10 having an opening therethrough to a surface of a substrate; a gate electrode 28 over the surface of the substrate and within the opening, the gate electrode having insulating material 16 on a bottom and on two sides 40 of the electrode, wherein the insulating material on the bottom of the gate electrode contacts the substrate; and source and drain regions (24,26) adjacent the insulating material on the gate electrode, each source and drain region including a first portion (14,16) in the substrate and a second portion 50 on the substrate over the first portion and adjacent to the insulating material on the sides of the gate electrode, the first portion being more lightly doped than the second portion (see figures 1-10 and col. 2-line 7 to col. 3-line 43).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 78-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu, U.S. Patent 4,841,347 in view of Doan et al., U.S. Patent 5,346,587.

Hsu is applied as above but fails to expressly disclose that the field oxide opening has vertical sidewalls. Doan et al. discloses either forming a bird's beak field oxide to create a slanted wall opening 32 (see Figure 3) or a straight walled vertical field oxide 52 (see Figure 5). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the structure of Hsu so as to form a straight walled opening for the field oxide because this is an appropriate form of isolation and the removal of the bird's beak will allow for higher integration.

Claim 91 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu, U.S. Patent 4,841,347 in view of Rodder et al., U.S. Patent 5,079,180.

Hsu is applied as above but fails to expressly disclose where the first portions of the source and drain include LDD and heavily doped regions. Rodder et al. discloses a raised source/drain structure where LDD regions and heavily doped regions are formed in the substrate (see fig. 2D and col. 5-lines 5-19). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made

to form the LDD structure of Rodder et al. in the primary reference of Hsu because LDD structures have several well known benefits including the reduction of hot carriers which degrade the gate oxide.

Claims 77-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pierce, U.S. Patent 5,422,289 in view of Doan et al., U.S. Patent 5,346,867.

The rejection is maintained as stated in the paper mailed 3-13-01 for the reasons of record.

Response to Arguments

Applicant's arguments filed 5-22-03 have been fully considered but they are not persuasive. Applicant argues that the second portion of the source/drain 50 in Hsu fails to function as a source/drain. The examiner respectfully disagrees since the device of Hsu has the same structure as the instant invention in that the second portion contacts the source and drain doped region formed in the substrate. Furthermore, the second portion of the source/drain region 50 is not formed for lowering the resistance of the silicide contact but rather for lowering the resistance of the source/drain itself. Silicides have lower resistances than polysilicon because they comprise metals which have higher conductivity, and therefore it would be improper to allege that using a silicon layer in combination with a silicide layer will lower the resistance of a single silicide layer.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is 308-3446. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are 308-7724 for regular communications and 308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-1782.



Richard A. Booth
Primary Examiner
Art Unit 2812

June 4, 2003